

Management of Annuloaortic Ectasia

in Association with Aortic Regurgitation

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Annuloaortic ectasia associated with severe aortic regurgitation is usually managed by implanting a composite graft that comprises both valve and conduit. Synthetic valved conduits have been used by most cardiovascular surgeons, with various modifications in the technique. Yet prosthetic valves carry the risks associated with anticoagulation therapy, together with an increased risk of infective endocarditis. We report a case in which a cryopreserved aortic homograft was used for a Bentall procedure in a patient who had annuloaortic ectasia with severe aortic regurgitation. To the best of our knowledge, there are no prior published reports of homograft insertion in treatment of annuloaortic ectasia. (Tex Heart Inst J 1998;25:68-71)

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Case Report

In June of 1996, a 53-year-old man presented with complaints of palpitation and angina of 6 months' duration. Clinical examination revealed a grade 3/6 systolic ejection murmur at the aortic area and a loud early diastolic murmur along the left parasternal border. There were no clinical features of Marfan syndrome nor a family history of that disorder.

Chest radiography (Fig. 1) revealed cardiomegaly and a dilated ascending aorta. Electrocardiography showed sinus rhythm with left ventricular hypertrophy. Trans-thoracic echocardiography revealed severe aortic regurgitation and dilatation of the aortic root and ascending aorta. Left ventricular function was normal. Pre-operative transesophageal echocardiography showed an aortic annulus that was 27 mm in diameter.

Cardiac catheterization revealed normal pulmonary pressures and a slightly elevated left-ventricular end-diastolic pressure. Angiocardiology revealed aneurysmal dilatation of the ascending aorta (Fig. 2) and left ventricular enlargement, but good left ventricular contraction. The coronary arteries were normal.

Surgical Technique

A median sternotomy was performed. The ascending aorta was aneurysmal (8 x 6 cm) in a manner typical of annuloaortic ectasia, and the aortic cusps showed thickening. In the posterior wall of the aorta, there was an intimal tear about 2 cm long, just proximal to the origin of innominate artery. Cardiopulmonary bypass, moderate hypothermia, and cold-blood cardioplegia were used. The aneurysm was opened longitudinally. The cold blood was infused directly into the coronary ostia. The aortic cusps were excised and a 24-mm cryopreserved aortic homograft was chosen. The proximal end of the graft was sutured to the annulus with 4-0 polypropylene interrupted sutures, and openings in the graft for the coronary ostia were anastomosed to the native coronary ostia. Distal aortic anastomosis was just

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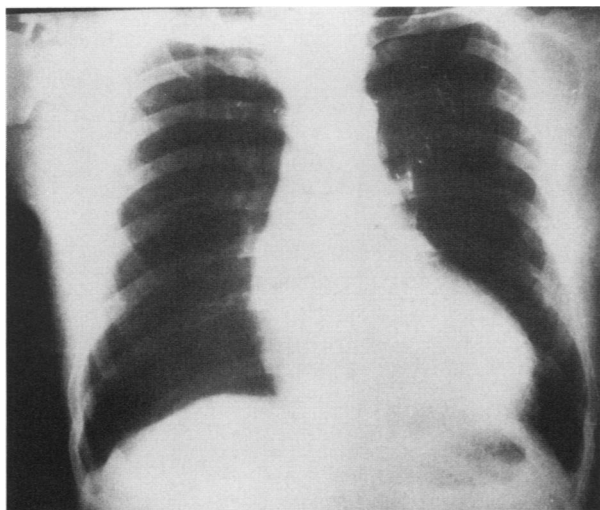


Fig. 1 Preoperative chest radiograph showing cardiomegaly (most notably, left ventricular enlargement), and dilatation of the ascending aorta consistent with aneurysm.

proximal to the origin of the innominate artery. The aneurysmal wall was sutured around the graft. A Cabrol's fistula was made between the right atrial appendage and the aneurysmal sac. The patient made an uneventful recovery and was discharged on the 9th postoperative day.

Transesophageal echocardiography performed on the 8th postoperative day showed good left ventricular function and no aortic regurgitation. Magnetic resonance imaging showed uniform blood flow into the ascending aorta and arch (Figs. 3 and 4). The patient was doing well at 18 months after surgery. Transthoracic echocardiography performed at that time showed normal aortic valve function.

Discussion

A composite valved graft is usually necessary for patients who have annuloaortic ectasia with dilatation of sinuses and the ascending aorta. The original technique was described by Bentall and De Bono.¹ Various modifications for coronary artery implantation in the graft were introduced later.^{2,4} In this particular patient, we used the original technique (inclusion wrap) of Bentall. Although a high incidence of early reoperation for excessive bleeding after the Bentall procedure has been reported,⁵ we did not have such a problem in our case. Aortic dissection poses a great problem late after placement of synthetic grafts.⁶ The coronary ostia of the homograft can be aligned directly with the native coronary ostia, which enables more natural positioning of the coronary arteries.

Cryopreserved aortic homografts are attractive alternatives to synthetic grafts. In the past, such homo-

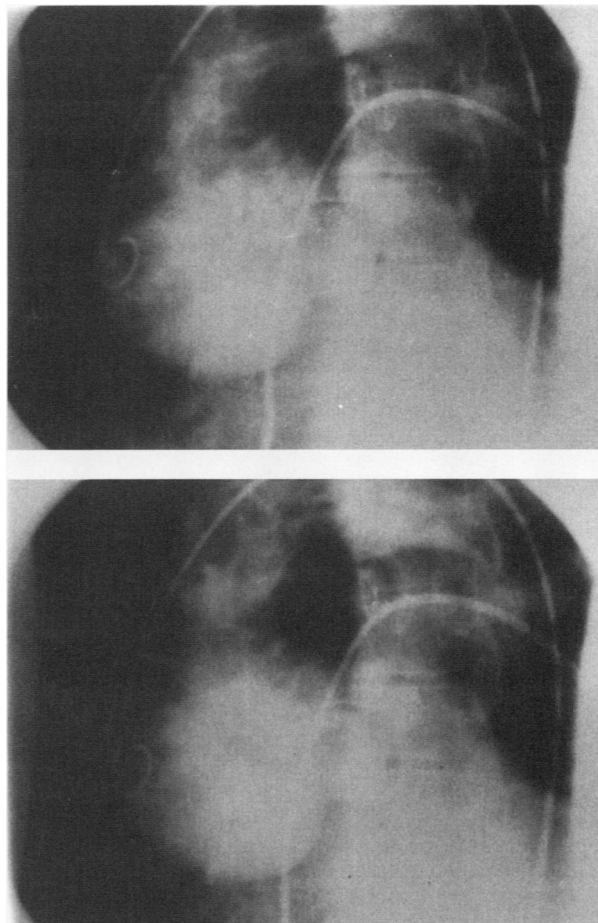


Fig. 2 Aortic root angiogram in left anterior oblique view, showing extensive dilatation (typical of annuloaortic ectasia) of the aortic root, ascending aorta, and transverse arch.

grafts have been used for aortic root replacement in cases of aortic dissection: there have, in particular, been good long-term results with free-root homografts.^{7,8} In comparison with synthetic grafts, homografts cause less suture-line bleeding, are easier to handle, provide normal hemodynamics, and are resistant to infection. Barratt-Boyes and coworkers,⁹ Bodnar and Ross,¹⁰ and O'Brien and colleagues¹¹ had higher survival rates, lower incidences of structural deterioration, and less need for reoperation with the use of homograft valves that had been stored in antibiotic solutions or cryopreserved. O'Brien and colleagues¹² have reported $78 \pm 4\%$ freedom from reoperation at 15 years when cryopreserved aortic homografts were used. Our own experience with aortic root replacement (using both autografts and homografts) for aortic valve disease has shown excellent results for up to 4 years.^{13,14}

To the best of our knowledge, there are no prior published reports of homograft insertion in treatment of annuloaortic ectasia. We present this case because it shows that the inherent advantages of



Fig. 3 Postoperative magnetic resonance imaging (here a gradient-echo image in sagittal oblique view) shows uniform blood flow in the ascending aorta and arch. The replaced aortic root is normal in caliber, and the anastomotic site is well defined.

homografts make them a good alternative to synthetic grafts. Annular dilatation and subsequent progressive aortic regurgitation need not be feared, unless the patient's aortic root diameter is greater than 30 mm. We reinforced the proximal suture line with the native valve cusps, which we retained although pericardium can also be used for reinforcement. In addition, the closure of the aneurysmal sac around the homograft and the creation of a Cabrol fistula provide the dual advantage of protecting the homograft and avoiding the collection of blood around the graft from small leaks in the suture lines. The fistula closes within a couple of days and at discharge from the hospital no shunt is detectable. The

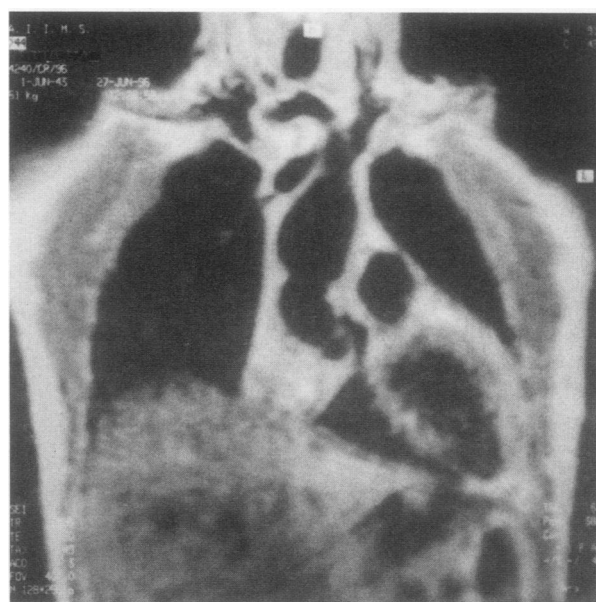


Fig. 4 Magnetic resonance imaging (here a spin-echo image in the coronal plane) shows the homograft in the aortic root, surrounded by high-signal-intensity native aorta.

performance of such a homograft in the early postoperative period is encouraging.

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